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MASB 45-89

7 September 1989

High Performance Electrolummiscent Memory Display

Background. Thin film electrolummiscent (EL) devices with memory are very attractive for panel displays with high information context. Practical development of EL memory displays have been hampered by problems of instability and reproducibility. Professor I. Solomon of the Ecole Polytechnique in Paliaseau, France, and Dr. P. Thioulouse of the nearby Centre National d'Etudes des Télécommunication (CNET) Laboratoire in Bagneux, proposed a new thin film structure in 1986 which overcomes these problems. Prototype displays have since been developed. In this device, a photoconducting (PC) thin film of amorphous silicon is added to the usual sandwich structure for EL displays. The memory effect results from the optical coupling between the PC thin film and the EL active layer. In the *off* state, the PC layer is high impedance and thus the voltage drop across the EL layer is small. In the *on* state, the PC layer has a low impedance caused by the illumination from the EL film. The hysteretic switching of the PC film provides a memory effect which is controlled by the external bias. The PC film also improves the contrast ratio by providing a high impedance isolation of the EL film in the *off* state.

Technical Properties. The performance characteristics for the memory effect of the Thin-Film-Photo-Conductor-Electro-Lummniscent (TFPCEL) device is shown in Figure 1.

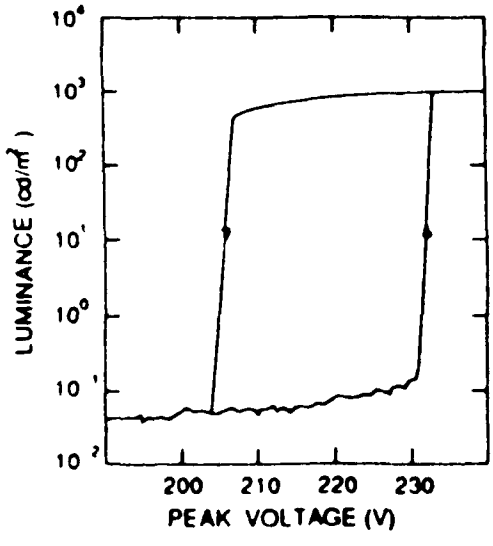

Figure 1. Actual hysteresis curve of an electroluminescent device with pixel memory. Operation in the dark with a 1 kHz sin-wave.

Phototype displays have been fabricated with a panel format of 640 by 400 pixels. The dimensions of the array are 195 by 122 mm-squared. The operational parameters for the display are summarized in Table 1.

Table 1. Performance Parmeters for TFPCEL Display. Format: 640 x 400 pixels[1]

	Typical EL screen	PCEL Screen[3] Normal L Option	High L Option
Mean luminance (cd/m2)	25[2]	50	325
Typical power	17 W	1,6 W	11 W
Peak current per line	50 mA	0,5 mA	3 mA
Peak current per column	9 mA	70 A	0,5 mA
Switch voltage - line	220 V	45 V	45 V
Switch voltage - column	60 V	15 V	15 V

[1] Display surface: 195x122 mm²
[2] With circular polarizer
[3] Estimated values

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